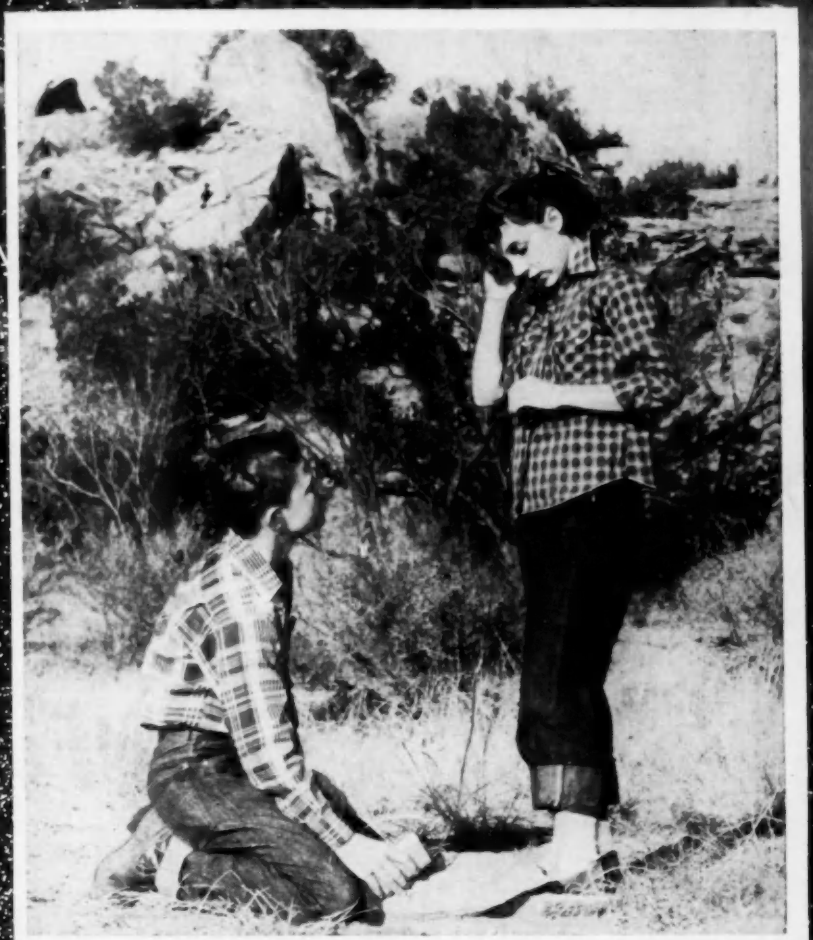
Earth Science DIGEST



Martha and Arthur Harding, twin high school students, prospecting for uranium in Palo Duro Park. (See page 7.)

35¢

January - February, 1955

Earth Science

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Rockhounds' NATIONAL Magazine

Vol. 8, No. 1

CONTENTS, JANUARY-FEBRUARY, 1955

EDITOR'S MEMO PAD

To what end,—Earth Science! It is safe to assume that all of our readers have some definite interest and/or objective in their pursuit of Earth Science. Is your interest in Earth Science merely a means to an end, or an end to a means, might be a fair question to ask.

Obviously all of the many thousands of its devotees so widely scattered throughout the entire country, do not all have the same incentive. Any subject with so broad an aspect as Earth Science, and so diversified in its character, must possess facets which are bound to intrigue and hold the attention of many folks in every walk of life, regardless of their educational background, their social position or their occupational standing.

Whatever these interests may actually be, they are certainly, for the most part, worthy of our consideration and respect. While the sole ambition of some may be simply to acquire an "Oh-My!" collection stressing specimens which will give enjoyment to and command the admiration of their friends, on the other hand some may collect only representative material, largely for its educational or reference value. Then too, there are of course, the "in betweens" with the ordinary run-of-the-mine collections, consisting of a little of everything; each piece perhaps to its owner has some definite meaning or may represent simply a pleasant event or a memory. And so on, there are variations in the expression of our interests without end. Some, even, may be intensely and genuinely interested with the Earth Sciences and not even collect at all.

All this leads up to our saying that we are of the opinion that the most essential value of Earth Science need not necessarily be the mere physical aspect of the collection of materials, as enjoyable as that may be For our pre-occupation with it may increase the sum total of our knowledge concerning the Earth, and our relationship to the world about us, of which we are an integral part, and lead to an understanding of the real purpose of our life on the planet Earth. We may by means of such endeavor perhaps catch now and then a fleeting glimpse of the hand which guides not only our own destiny but that of the universe.

Letters

"I want you to know how much I appreciated your article, 'Saugus, Cradle of American Industry.' Until January, 1944, I had always resided within ten miles of Salem, Massachusetts, and my business as well as my pleasure activities made frequent visits to the vicinity of the Saugus Iron Works more or less of a necessity, and on such visits to or through Saugus I frequently wondered where the old iron works site might have been, but I never was able to obtain any definite information. The location of the Saugus Iron Works was not the only iron works mystery of those days, for from 1908 to 1917 I resided in Middleton, Massachusetts, where as a Boy Scout and as a lover of the outdoors I frequently visited Cushing's Pond (sometimes designated as 'Donkins' Pond' off Liberty Street in that town. This is a man-made pond, at the dam of which there were visible the foundation and tail race of what was said to have been a knife factory. In fact, a small amount of iron work—if I remember correctly, a bevel gear on the upper end of a vertical shaft—was still in place in those days. It was rather generally understood that bog iron had been mined near this factory, but no one was ever encountered who could state just where this mine had been, and careful search of the area never revealed a trace of the workings. Of course, if your researches happened to cover this site, I would be glad to know what results you had."—ALFRED M. PERKINS, (more frequently known in rockhound literature as "Don Alfredo"; see EARTH SCIENCE, December, 1949), 322 Linda Vista, Las Cruces, New Mexico, December 10, 1954.

"Thanks for sending me a copy of your magazine. I like it. So please enter my subscription." —Warren, Arizona.

"I have learned new things I did not know before—'Cradle of American Industry,' as an example. You do have a fine magazine."—Vista, California.

"I think you have done nobly in preparing these articles in Earth Science for the lay reader." —New York City.

"Enclosed money order for Earth Science. It is a wonderful little magazine. I have been reading

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a friend's. As she will no longer be receiving it, I would like my subscription to start with the next issue."—North Bend, Oregon.

*

Authors

Pollyanna B. Hughes of Canyon, Texas, is on the staff of Coronado Lodge at Palo Duro State Park . . . *Pernel Barnett,* of Orange, California, is a mining engineering consultant . . . *Henry P. Zuidema* is consultant on geology for the Mesa Verde Company and has spent several seasons collecting in the Mancos and compiling geologic data for the long-range expansion program in the area. In his article he introduces the subject of engineering geology to emphasize the relationship of events of the geologic past to the problems of the present . . . *Mrs. Julian Wetherbee,* of Keene, New Hampshire, an authority on mining and mineral lore of old New England, has been a frequent contributor. She has a rare faculty for striking "pay dirt" when she does research for an article . . . *Carl Trischka,* of Warren, Arizona, is a geologist and mining engineer.

*

Cover

Happy is the geology teacher whose students take to the field, attracted by a Geiger counter, or whatever! (See page 7.)

—Ben Hur Wilson, *Editor*

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Earth Science

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Prospecting Is Sport In Palo Duro Canyon

by POLLYANNA B. HUGHES

RECENTLY, a concession was introduced at Palo Duro Canyon State Park in the Texas Panhandle offering Geiger counters for rent. The rental of Geiger counters is not unusual with the prospecting craze so widespread, but the idea of renting Geiger counters as a sport, a recreational device, a sort of game—that was new.

The new sport is not necessarily one without rewards, either. Because Palo Duro Canyon has not been prospected for uranium, no one can say whether it contains uranium or not. Even since the concession opened, Palo Duro has not been extensively prospected. That would take years, since there are 15,103 acres within the park, and the park is only a small part of the entire Palo Duro Canyon.

Within a month after the Geiger counters were put in Coronado Lodge, a colorful building located on the canyon rim just past the park entrance, several persons applied to the Texas State Parks Board for leases on sections of the park. They say they have found uranium in paying quantities. Whether they have or not hasn't yet been determined, but geologists say it is not unreasonable to assume that uranium could be found in Palo Duro.

Formations within the park include Permian, Triassic, Pliocene and Pleistocene. There is some debate as to whether or not Jurassic is included in rocks at Palo Duro. Experts say additional work is needed to determine its presence or absence. This is important to prospectors, since Jurassic deposits farther west have proved good uranium hunting-grounds.

One geologist points out that formations in Palo Duro Canyon were laid down from the same source and at the same time as those of the Colorado Plateau—and the plateau is a network or uranium claims now.

Pete Cowart, park manager, says he can't promise that anyone who rents a Geiger counter will find a million-dollar deposit of uranium.

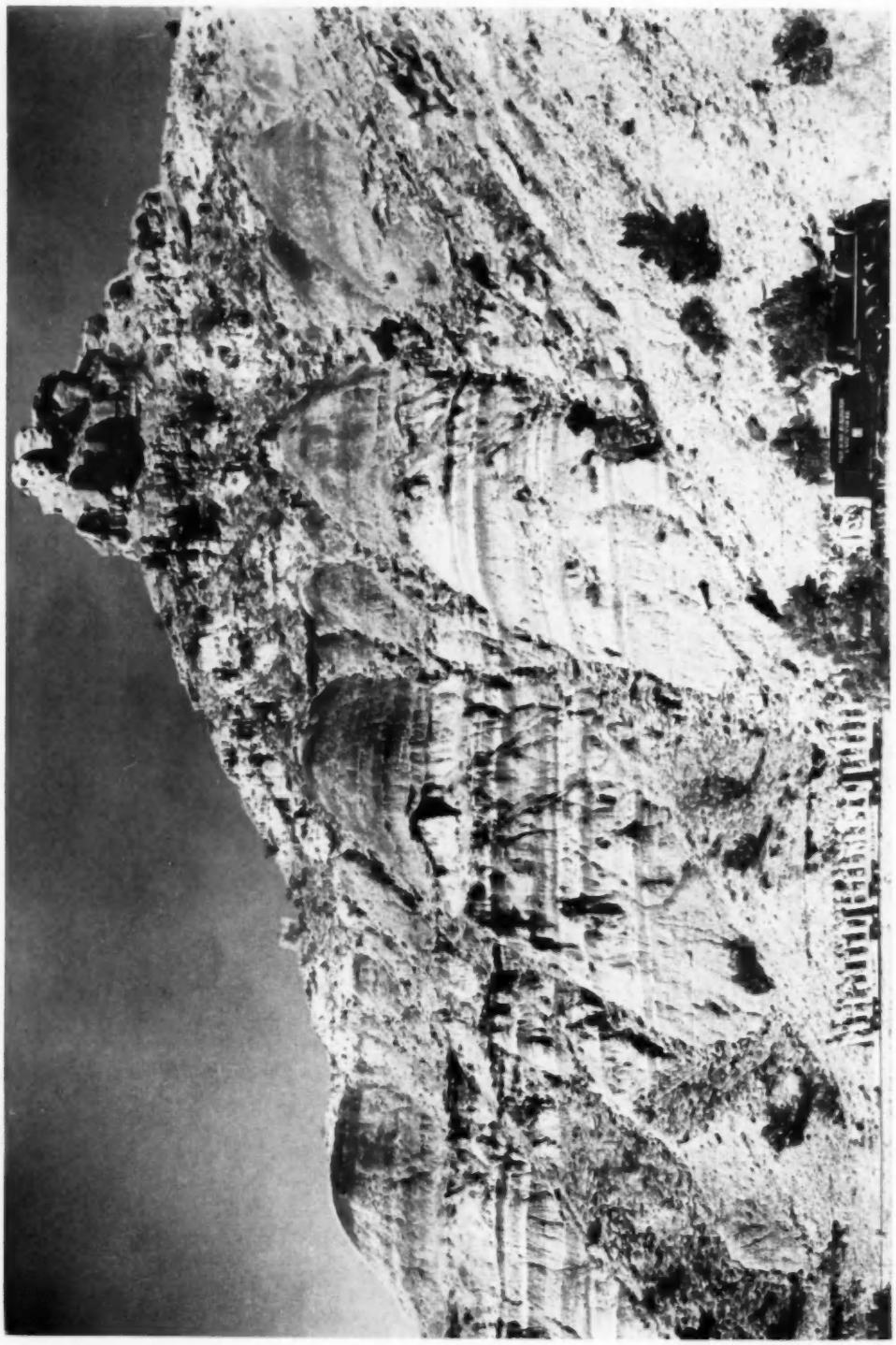
"If I knew where there was a deposit of uranium in this park," he says, "I wouldn't be standing around renting Geiger counters. No one knows whether there is uranium in the park yet, and the only way to find out is to go in there and test the formations with Geiger counters—test each and every exposure."

Cowart does know now from talking with those who have rented the counters, that taking a whirl at prospecting for uranium is fun. School groups learn about rocks and pick up some knowledge of geology by prospecting in the park, reading literature distributed with the Geiger counters.

It isn't an expensive operation, either. The counters rent for fifty cents an hour, four dollars a day. They are simple little things. The aluminum units fit into a jacket pocket, and if radioactive minerals are encountered, the prospector hears a rapid-fire number of clicks through earphones.

So far, Cowart has found people who rent the counters enjoy their outing, whether they find anything they want to investigate extensively or not. And no one has damaged the counters—a couple of small batteries have worn out, but that is normal wear and tear.

TRIASSIC PEAK, pictured on this page, is one of the most impressive of Palo Duro Canyon's formations. The bright-hued sedimentary layers visible in this peak lure prospectors to test each type.



Two orders have been placed for the booklet, "Prospecting for Uranium," published by the U. S. Government Printing Office and prepared by the Atomic Energy Commission and the U. S. Geological Survey. Prospectors want to learn more about what they're doing, and these little booklets, which sell for fifty-five cents, tell the story simply and accurately.

"It gets you," a Canyon businessman said after his first tour at prospecting in Palo Duro. "You listen to the clicks from a red rock, then you think you'll go on home. But there's a greenish-colored rock a little way up the hillside, so you just have to see what it does to the counter. Fascinating."

Two secretaries from Dallas read about the concession and took their next weekend to come out and prospect. They rented one of the native stone cabins at the park and settled down. They didn't satisfy their curiosity during the weekend—they stayed a week. Cowart says they were up before dawn every day and stayed out until dark every evening. They were back two weeks later to prospect some more.

Roger Ridgway, a physics student at West Texas State College in Canyon, eleven miles west of the park, rented a counter. He got so interested that he volunteered to go on field trips with the college geology department to learn more about the subject. He spent two weeks building a Geiger counter from spare radio parts and added electronics equipment. He says the counter cost about twenty dollars to make.

Told he could have bought a new, more compact counter, for little more than he spent, he said;

"But then I wouldn't have known how a counter was made. Now I know exactly what parts are in this thing and how it works and why."

He went further. He set up equipment in his room at the men's dormitory to make bead tests for Palo Duro prospectors who wanted to verify or discredit Geiger counter counts. In thirty minutes, he can tell a prospector whether he has uranium or not.

Even small children find prospecting an entertaining way to spend time in Palo Duro. They can pick up the knack of discerning unusually high counts as quickly as adults.

At Palo Duro, prospecting is so easy that children as well as adults can go along. Coronado Lodge serves as the base of operations. At the lodge is a store where food and drinks can be bought. From the lodge, a paved highway winds into the depths of the canyon, 1,200 feet down to the Permian redbeds that form the floor.

Fresh water and rest rooms are provided at several spots along the highway, and there are two cold drink and sandwich stands along the route in addition to the lodge. A ride on the narrow-gauge Palo Duro, Burlington & West Texas Railroad gives a chance for looking over available exposures and deciding where to prospect. This little train chugs around nearly two miles of track through side canyons that were completely inaccessible until its introduction two years ago. Jim Bailey, the engineer, delivers a lecture on a loud-speaker while the train is making its tour, pointing out various formations, unusual rock outcrops, and historic points of interest. All for fifty cents.

Rock collectors have a field day in Palo Duro. There is no ban on taking samples of rocks within the canyon, and the variety of beautiful outcrops is veritably endless. It is necessary to take samples if prospectors find anything they think might be uranium.

As Cowart outlines it, the procedure for these amateur prospectors at Palo Duro is simple. They find a rock that causes the Geiger counter to sound like a machine-gun being fired. They take a sample of the rock, as much as a pound. They have a bead test made on the rock, or they rig up a photographic test with the government bulletin as a guide. If the test or tests indicate uranium, they send the rock sample to one of the government stations or to a private assayer to determine how much uranium the rock contains. If the assay shows

they have hit pay dirt—which can be as little as one-tenth of one per cent—they apply to the Texas State Parks Board for a lease on the area of the park containing their deposit of uranium.

Most of the people who have rented Geiger counters at Palo Duro do not seem terribly concerned about the procedures to be followed if they find uranium. They are principally delighted to dicker with a Geiger counter and learn what one does when one goes out to find that fabulous stuff — uranium. They like prospecting mainly as a hobby, as an interesting and educational way to spend their time while seeing the "world's most beautiful canyon."

Fortunately, Palo Duro Canyon is accessible for natives and tourists. The canyon is twenty miles south of Amarillo, only fifteen minutes from transcontinental Highways 60 and 66, and north-south Highway 87.

Cowart says he thinks tourists moving west for the first time since the uranium hunt became such a craze will enjoy stopping at Palo Duro long enough to try for themselves using a Geiger counter. They can learn inexpensively and effortlessly what prospecting is like before they reach the proven uranium fields further west.

A Trip to Lead Pipe Springs

by PERNEL BARNETT

THE MEMBERS of the Whittier Gem and Mineral Society had long planned a trip to Lead Pipe Springs for blue chalcedony, but had been unable to get permission for such a jaunt until this fall. Luckily, the notice came just after the weather turned cool, so everyone who could get away was "rairing" to go.

This is one of the places talked about by everyone, but only a few get the chance to fulfill the dream. Lead Pipe Springs and surrounding territory have long been a popular hunting ground of old time rockhounds. Blue chalcedony, fire opal, myrikite, and others have been found.

Since the Navy established the Naval Ordnance Test Station directly in the middle of our happy hunting grounds, the pickings have been slim; consequently there is plenty of good rock left. Small pieces of blue agate can still be found on the surface, but pieces of solid blue as big as a soft ball are not staring one in the face any more. Nodules and geodes as large as a football can be had for a little hard work. Some are only a few inches under the surface.

With 50,000 rockhounds in Southern California, what more can you expect? In some of the famous collection areas every rock that looks even slightly like agate has been picked up and licked at least three times. (In fact, I sometimes wonder if the smooth places on some of the agate is not tongue worn.)

Permission to hunt rock must be obtained from the Commanding Officer of the Naval Ordnance Test Station at China Lake. Arrangements must be made ahead of time. A list of cars, giving make, license number, and names of all occupants must be sent in with request for a specified date, which must be on a weekend or holiday. Also you must accept a time when they are not bombing or whatever it is that they are doing. (Some of the stories indicate something very secret.) No one is allowed beyond certain designated areas. No firearms or cameras are permitted. The party must enter as a group at a stated time and leave as a group by a certain hour.

This is truly a desert area, so all food, water, and camping equipment must be taken along. The summer months are much too hot. December and January can be very disagreeable. Spring and fall are the best. If we should have a wet winter, then April is the ideal time, as there will probably be flowers.

Our group had twelve cars, containing about forty men, women and children, plus two dogs. We were courteously escorted by a jeep off the oiled road onto a dirt road (rather a track) and left to our own devices. This is one place you are not going to be lost for long. Anyone failing to show up for exit roll call is going to be hunted by all the resources of the Navy, (and probably bawled out properly by the searchers).

Between Johannesburg and Red Mountain a road leads one toward Trona and after about 17 miles a right turn puts one on a Navy road for 14 miles to the Navy Test Station buildings. Then there were four miles of oiled road. As most vehicles were ordinary passenger cars the next nine miles after that were traversed at a snail's pace, as the road had never seen a grader. There were chuck holes every few feet. However, the fall desert air made it worthwhile, if for no other reason.

As is often the case the actual location may be miles from the place named. Some opal is found on the hillside about a hundred yards from the spring. Another location is about one half mile to the east of the spring. But the blue chalcedony is some two miles or more northeast.

We went directly to the hill where the geodes would be found and made camp. Some used gasoline stoves, others open camp fires. Nothing in the permit was said about fires. (Anyway, even a pyromaniac couldn't start a fire that would get away if he had a five gallon can of gasoline and a box of matches.)

On a previous day I had found a spot where there were lots of nodules, just as I had to leave; so I spent the first part of this day looking for that location. As I had failed to mark the spot, I had to give up about noon as my memory seems to have failed me.

In about ten minutes I had located another place just as good. After I had taken out all I could carry in two or three trips down the hill, I let some of the others work this hole, and of course they took out better than I had secured. (Just my luck!)

The nodules and geodes are red balls of rhyolite shot through with blue chalcedony. Sometimes the larger ones will have streaks of blue a half inch wide coming to the surface in several places. The nodules are dug out of the soft material. The red rhyolite takes a polish, so the red and blue make a pleasing contrast. As blue is a fugitive color the blue chalcedony must be cut quite thick.

Nearly everyone hunted until dark. The next morning I went scouting for greener pastures I had heard about. But, of course, there was nothing to it, except that we did find some of the purple agate. By noon most of us had moved to the opal beds.

BLUE CHALCEDONY GEODE *(approx. 12" dia.)* from Lead Pipe Springs, California.

The only one I found worth taking home was lying beside the path in plain sight, just as though the others had left it for me. Several nice opals were found without much work. Enough opal was obtained to show that it is there.

Lead Pipe Springs opal does not equal Mexican or Australian opal; nevertheless it is of some value. Once in awhile a really good stone is found with plenty of fire. It is in nodules in a bed of tuff. At one time this place was worked commercially,

and stones of an inch in diameter were found. Since no dynamite is permitted on the Testing Station grounds by the government, the amateur of today with pick and shovel is lucky to get such a prize after many hours of hard work. Happy hunting!

A Mountain Defeats The Roadbuilders

by HENRY P. ZUIDEMA

MAN'S UNCEASING DEMAND for getting across the country faster has led to many audacious highway projects, with or without regard for geologic factors.

Air hammers and explosives chip roads along precipices that would confound a mountain goat and switchbacks are being hacked up and down peaks in defiance of the angle of repose.

The limiting factor more often is the budget maker's blue pencil than consideration of the once-respected law of gravity. Whereupon new country is opened to the tourist and sportsman—and the geologist gets a new look at a rock section merely by falling out of a field car.

However, sometimes the mountains strike back and the engineer, having solved one problem, faces a new one.

In the southwest corner of Colorado, the Mesa Verde rises more than 2,000 feet above the Montezuma Valley, with the steep north escarpments of the Mesa flanking Highway 160, the main east-west travel artery. The presence in canyons far back on the mesa of the finest cliff dwellings in North America has made the "great green table" the most-visited archeological locality in the United States.

Establishment of Mesa Verde National Park made necessary a road-building program to afford easy access to the top of the mesa and across it to the famous ruins.

The entrance road winds up the north

THE "STABILIZATION" PROJECT OF 1937. Heavy wire mesh is in place as workmen apply cement coating and then canvas is put in place to retard drying of the cement.

NORTH ESCARPMENT OF MESA VERDE, looking northeast. Arrow indicates position of Knife Edge Road, cut in the Mancos shale. Vertical cliffs are in Point Lookout sandstone. (1954 photo)

escarpment of the mesa and then for a distance swings along the outer face, forming the spectacular Knife Edge Road. The novice at western driving believes he is about to glide into space at the curves, but the experienced mountain driver enjoys one of the most alluring views in the southwest. A fifty-mile panorama includes Ute Peak (the "Sleeping Ute") to the west, and the peaks of the San Miguels (Lone Cone, Dolores Peak and Mt. Wilson) to the north.

On the way up, the LaPlata Range forms the backdrop to the northeast.

The building of the Knife Edge Road, however, soon presented difficulties. Rock falls and slides bedevilled the maintenance crews. The road was widened constantly, but nothing could be done about the precipice above. The geology of the mesa, in fact, is such that the situation seemed rather hopeless, but the road builders would not admit defeat.

The Knife Edge section had been cut in the Mancos shale which underlies the mesa. During a very long interval of the Cretaceous period, the Mancos attained the great thickness of more than 2,000 feet. Near the base of the formation are limy layers, rich in the fossil remains of mollusks and fishes. The teeth of huge sharks frequently are found. Elsewhere other raiders of the Cretaceous seas of a hundred million years ago —large swimming reptiles—have left their bones. In the skies at the time were flying reptiles, some with wingspread exceeding 20 feet.

The shoreline of the ancient sea moved progressively beyond the region of the present mesa during Mancos time and the sediments became finer as deposition went on.

Attacked by the weather today along steep exposures, the shale is soon reduced to a gumbo. It crumbles and slips on inclines. At lower elevations it erodes into low mounds and hills. The Mancos also forms the sloping pedestals of numerous sandstone-capped buttes and pinnacles along the highway past Ute Peak on the way to Shiprock.

A slight elevation of the land brought into the Cretaceous sea coarser sediments washed from adjacent highlands to form

the Mesa Verde group of rocks which rest on the Mancos shale and cap the present-day mesa.

The first thick bed of massive, coarse, and cross-bedded sandstone just above the Mancos shale is the Point Lookout sandstone. Rain water percolates through it to the underlying shale and hence, at the shale exposures along the Knife Edge cliff, assists in the work of weakening the shale.

Unsupported as the shale weathers away beneath it, blocks of the sandstone fall and slide to the road, adding to the troubles of the maintenance crews.

By 1937, the Park Service decided that something should be done about "stabilizing" the Knife Edge escarpment and a plan of action was adopted.

Wide strips of heavy wire mesh were anchored to the cliff above the road and spread over the rock face. Scaffolds were raised and crews sprayed the mountain side with a mixture of cement, sand and water to form "gunite." The new surface was permitted to dry slowly under wet canvas. The surface then was given a finishing coat of cement tinted to match the color of the cliff so that even the buzzards did not know the difference.

All went well until rain and frost again went to work. The cement coating was undercut by rivulets and left unsupported. Expansion of freezing moisture and snow slides helped speed the attack. Only a few remnants of the coating remain in place today.

So now the Park Service is planning the next move. It regrets that the spectacular stretch of the Knife Edge Road must be abandoned, but the mountain appears to have won the battle. The Geological Survey has made test borings through the shale and sandstone and believes that it will be feasible to blast a tunnel through the mesa as an underground short-cut for the highway to the archeological sites.

A thrilling ride up the mountain will lose some of its allure, but the Knife Edge will no longer cut into the maintenance budget.

EXHIBIT OF THE EVANSVILLE LAPIDARY SOCIETY at the Annual Indiana Hobby and Gift Show held at the Indiana State Fair Grounds, Indianapolis, November 13 through 21, 1954. This exhibit won first prize among all of the club displays. Shadow boxes contained rough and cut pieces, faceted stones and cabochons. The desk at the left is a faceting desk while that at the right is for cabochon cutting. The case in the center contains finished jewelry. All objects were the property of society members. The exhibit was designed and built by Mr. and Mrs. Glenn A. Black, shown at the right.

Oldest Mine Operating In New Hampshire

by MRS. JULIAN WETHERBEE

HIGH UP ON ISINGLASS MOUNTAIN, about 1½ miles northwest of Grafton Center, New Hampshire, (U.S. Route 4), is the Ruggles Mine. The mine started in 1803 and at that early period mica was produced. This property has the distinction of having been the first mine in the United States to produce sheet mica.

In the 150 years of mining, the mine has changed much in appearance. The earlier openings were several open quarries in the steep slope; now the lower ones are covered with the dumps from above.

The mine today is over 200 feet long and about 90 feet wide and over 100 feet deep. The company has done away with the hoist, as a means of taking out the feldspar and mica and other associated minerals, from the mine. The Whitehall Company, owners since 1935, have driven a tunnel from the side of the hill into the pit. Through this tunnel they bring out the minerals, take in their large trucks, bulldozers, loading machinery and other equipment.

Inside this mine, looking up, one can see the stopes up higher in the walls, making it look like cliff dwellers' homes.

The mica obtained here in the Ruggles Mine is of a good rum color and crystals of 2 feet in size have been found. Among other minerals is the perthitic feldspar of a very good quality, which for many years has been used in one of our well known household cleaners.

Feldspar is the main mineral mined today and the mica and beryl are secondary, with quite a large amount obtained each year. There are other minerals which are much sought by many mineral collectors: the uranium minerals, quartz crystals and many others in smaller amounts.

People drive up the hill just to look at this famous mine. Collectors come hunting for specimens, but let me advise you now, it is best to get permission before going to the mine. This may be done by contacting the office of the company in Keene, New Hampshire.

Standing on top of the dumps one can look around in all directions and get a wonderful panoramic view of the surrounding country. Mt. Cardigan, 3,121 feet high, is north to northeast, Forbes Mountain, 2,255 feet high, is to the east, with Ragged Mountain to the southeast, and many lesser hills all around.

In the fall when the autumn foliage is at its height, this is a wonderful spot to stand to view the wonders of nature: the reds, yellows, browns, with all the shades and tones in between, with here and there the evergreen trees touching up nature's canvas with their shades of green.

Then after looking and getting your fill of nature, in its ever changing hues from day to day, look over the dumps or go into the mine and find what was made thousands upon thousands or millions of years ago. Find the green of the torbernite and the appatite, the pink of the montmorillonite, the golden color of pyrite (also known as fool's gold), the orange of gummite, the yellow of the uranophane, the black of tourmaline, the deep red of the garnets, the cinnamon brown zircons, and everywhere you look the shine and sparkle of the sun on the mica. The uraninite mineral deposit here is calculated to be 304 millions of years old.

Of course this mine cannot compare in size with the huge open pit iron and copper mines found other places in our great land. These mines are larger but have not been in production as many years as this famous Ruggles Mine of New Hampshire.

There are other older mines in New Hampshire, but some of these have not been worked for from 50 to 100 years. Many are so overgrown with trees and brush they are hard to find. Others are filled with water and on a bright sunny day they reflect the blue sky and the trees that

have grown up around their rims.

The Ruggles Mine is in operation and trees and brush do not hide it from view. Going west on U. S. 4, looking over towards Isinglass Mountain, the dumps are plainly visible, shining white in the sun. Here is a mine not forgotten but producing, every day many tons of minerals in urgent demand for our complex, modern civilization.

Remarks on the Lore of Asbestos

by CARL TRISCHKA

aoBeoros, which is the Greek derivative of the word asbestos or asbestus, signified to the Greeks, inextinguishable or inconsumable and was applied to this mineral because of the legend regarding a certain stone, which once set on fire could not be quenched. Asbestos was known also to the Ancients by the name absistos, "Stone once heated, kept hot several whole days."

This fascinating mineral which we know as asbestos, was sought after by many who knew it, judging by the writings of historians and authors, from time to time as: albeston, albestone, abesto, abiston, asbeston, as well as mountain leather, mountain flax, asbestolith, salamanderite, earth flax, salamander hair and many others.

Popular names given to asbestos by various peoples are: By the French, mineral filamenteaux, because of its immunity to prolonged heat action and its incombustibility.

The Germans call it steinflachs, meaning stone flax.

In Canada among the French-Canadians it is known as pierre-a-cotton or cotton stone.

The Mexicans call it piedra de seda or silk stone.

The salamander, a small harmless amphibian, superficially resembling a lizard, was formerly fabled to be able to live in fire. In the theory of Paracelsus, of the 16th century, the being inhabiting the element of fire was a salamander, hence the names salamanderite and salamander hair.

Southey says—"Fly, Salamanders, on asbestos wings to Delia's firey glance"; Carlyle has this to say—"Woe to him whose edifice is not built with true asbest." Thus the poets and writers understood the functions of the mineral.

As far as is known asbestos was first found in the Alps and Ural Mountains and the Romans called it Amianthus, meaning unspoiled stone. The Italians called it amianto from the original Greek amiantoe, which means pure, undefiled and incorruptible.

Prior to 1800 asbestos was found in Italy, Russia, Austria, Sweden, Cyprus, Crete and China. Since then it has been discovered in Canada, Africa, Australia as well as in the United States in several places such as Georgia and California and notably in Arizona.

It may be argued from a technical point of view that asbestos should be called amianthus because the Romans called the white, silky and fluffy amphibole by this name. This is no doubt a well taken point but common usage has made asbestos a generic name: chrysotile asbestos; amphibole asbestos; tremolite asbestos; etc., and in this article asbestos will be used in conformity to common usage.

For more than two thousand years asbestos and its numerous varieties were known and used by artisans and artists to weave cloth and turn out jewels and ornamental stones such as nefrite, jade, cat's eye, and verd antique.

The Egyptians used it as mummy cloth and the serpentine as decorative stone.

Cremation cloth, a specimen of which may be found in the Library of the Vatican

was used by the Romans to wrap the kings and honored dead before placing them on the funeral pyre in order that their ashes might not be mixed with those of the fuel which was used to cremate them.

Pliny calls it asbest and refers to it as a rare and costly cloth, the funeral dress of kings.

Plutarch recorded that the perpetual lampwicks of the Roman times were of asbestos and that the material was called Carpasian linen made from the asbestos of Cyprus.

Asbestos was used in the lamps of the temples of the Vestal Virgins.

A beautiful golden lamp made by Callimachus, an Athenian artist, for the temple of Minerva was of such size that it was supplied with oil only once a year. The wick was made of asbestos.

Charlemagne about 775 entertained and mystified his guests by committing the table covers to the flames at the end of the meal. They were made of asbestos.

Marco Polo, in the thirteenth century, while in the Empire of Tartary or Siberia, was shown cloth which he recognized as the fibrous material amianthus, and which withstood the action of fire. This asbestos supposedly came from a mountain in the province of Chinchiutalas. China at present is an important producer of asbestos.

Collars and ruffs worn by the Chinese were made of asbestos, and laundered by being thrown into the fire.

In 1676, a Chinese merchant exhibited a handkerchief made of asbestos to the Royal Society of London, who called it salamander wool or linum asbesti.

Ferdinand III of Austria paid 18,000 gulden for an asbestos napkin, which because of its value was stored in the Imperial Treasury of Vienna.

HORIZONTAL vein of chrysotile asbestos found in serpentine, in Arizona.

This information comes from Teutchen Academie, 1679, as recorded by Joachim von Sandrath.

Nitkita Demidof, in 1715, began the mining of asbestos in the Ural Mountains. Shortly after that Peter the Great was influential in the establishment of a factory for the manufacture of asbestos articles such as textiles, socks, gloves, handbags, etc. The Nevjansko process was used and the industry was active for about fifty years.

Benjamin Franklin, who seems to get into almost every act, had a purse made of

asbestos which he sold to Sir Hans Sloane, President of the Royal Society, in 1757.

Napoleon the First, 1812, experimented with asbestos. It was proposed at that time to mix it with tar and apply it to houses and ships as a fireproofing material. With regard to the ships he was thinking of the planned invasion of England which never came to pass.

The first modern attempt to make use of asbestos commercially was in Italy in the Aosta valley by a London Syndicate in 1860.

The first mining operations in Quebec, Canada, were begun in 1877 and the work of dressing the rock was carried on by hand until 1889, when a mill was erected in Canada for that purpose. This has developed into an important industry.

Midwest Club News

BERNICE WIENRANK, *Club Editor*
4717 North Winthrop Avenue
Chicago 40, Illinois

MICHIGAN MINERALOGICAL SOCIETY was recently taken on a tour of Montana, via colored slides, by Dr. Willard Parsons, who also gave a fine interpretation of the geological features portrayed by the pictures.

WISCONSIN GEOLOGICAL SOCIETY heard "The Mineral Industry and its Outlook for the Future" discussed at its November 5 meeting by State Geologist George Hanson. "Since mineral deposits are wasting assets," Mr. Hanson stated, "our future supply rests on three principles: 1) Conservation: To use the minerals that we have wisely; 2) Geological exploration: To determine the nature and extent of our mineral resources; 3) Technological research: To extract maximum use from our mineral resources; to find substitutes for products which are scarce; and to find new uses for those which are abundant."

CHICAGO ROCKS AND MINERALS SOCIETY on November 11 was shown the colored motion picture, "In the Beginning," which deals with the early geological history of the earth. Following the movie, CRMS members enjoyed a "grab bag" exchange of mineralogical Christmas presents.

MINNESOTA MINERAL CLUB members felt as proud as Texans after seeing "This is Minnesota," a color film which deals with the wonders of their state. After the movie, shown at the November 12 meeting, the club awarded prizes for the biggest rock, the best rock and the most unusual rock on display at that meeting.

EVANSVILLE LAPIDARY SOCIETY won first prize for its exhibit of gem materials, cabochons, faceted stones and jewelry at the Annual Indiana Hobby and Gift Show, held in Indianapolis, November 13-21, 1954. The exhibit was viewed by more than 87,000 people, many of whom stated that this was the most beautiful display of its kind that they had ever seen.

ROCK AND RILL CLUB recently visited the site of a demolished dam in Union County State Park, near Beresford, South Dakota. The group collected golden calcite crystals from shattered limestone boulders, and picked up *octrea congesta* fossil rocks, mud *septeria* and petrified wood from the dry creek bed.

NEBRASKA MINERAL AND GEM CLUB viewed "The Grand Canyon Story" at its October 20 meeting. This colored motion picture tells the geologic story of the Southwest as revealed by the varicolored strata of rock exposed by the erosive action of the Colorado River in the Grand Canyon.

CHICAGO LAPIDARY SOCIETY on December 2, heard August Rassweiler speak on his experiences as a gem-cutter. Mr. Rassweiler was born in 1865 in Idar-Oberstein, Germany, where he learned gem-cutting and diamond-cutting. Coming to Chicago in 1888, he gained a reputation as one of the finest lapidaries in that city. Although now ninety years old, Mr. Rassweiler is still cutting gems.

ISHPEMING ROCK AND MINERAL CLUB published the first issue of its new bulletin, the *Jaspilite*, in December. It is filled with good articles, society news and gems of information. Because jaspilite is such a prominent mineral in Ishpeming, it was chosen as the name for the new bulletin.

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS learned the "Lore and Legends of Gemstones" from Mr. Jack Lund, Certified Gemologist, at its December 10 meeting. Mr. Lund told of the ancient beliefs about the talismanic and medicinal use of gems, and their use as seals and symbols. He also discussed the more common ways in which inferior material is foisted on the uninformed public.

INDIANA GEOLOGY AND GEM CLUB heard Francis Hueber discuss, at its November 12 meeting, the glacial features of Mount Tremblant Park, Quebec. This area was once the center and beginning of certain glaciers. Here the Laurentides show the direction of the ice passing over them by the rounded backs and abrupt fronts of the mountains. Long, narrow lakes filling valleys are common, and fills of former lakes are scattered throughout the area. Examples of pol-

OPENING GUN for the

Fifteenth Annual Convention of the Midwest Federation of Mineralogical and Geological Societies

June 23-24-25, 1955

at Hotel Detroiter

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ished granite and glacial stria can be seen.

ROCHESTER EARTH SCIENCE SOCIETY sponsored, on November 15-21, a demonstration of lapidary machinery and a display of gem materials by William Brunia of Gem Cutters Supply, Des Moines, Iowa. The exhibit was held in a vacant store in Rochester and attracted much attention.

*

NEWS OF OTHER SOCIETIES

MINERALOGICAL SOCIETY OF PENNSYLVANIA has drawn up a list of 10 rules for safe rock-hunting and has appointed a safety committee to see that the rules are obeyed during the group's outings. MSOP especially warns against the dangers found in quarries.

BALTIMORE GEM CUTTER'S GUILD'S founder and president emeritus, James W. Anderson, won first prizes with his individual entries of polished slabs and mounted gems at the Eastern Federation Convention's show, held October 12-16 in Miami, Florida. The BGCG won third prize for its group display of lapidary work.

SAN DIEGO LAPIDARY SOCIETY at present is compiling data for a book on field trips, which it plans to publish. Its bulletin, *Shop Notes and News*, is noted for its camping hints, "chuck wagon" menus and other suggestions that make field trips safer and more enjoyable.

RAWLINS ROCKHOUNDS MINERAL AND GEM CLUB will be host to the joint conventions of the Rocky Mountain Federation of Mineral and Gem Societies, and the Wyoming State Mineral and Gem Societies, June 16-19, 1955, at Rawlins, Wyoming. Plans include a non-competitive gem and mineral show and post-convention trips to the Wyoming Jade Fields and the Diamond Hoax Area.

CONTRA COSTA MINERAL AND GEM SOCIETY recently made a field trip to Lake County, Calif., where the group picked up several small diamond crystals in matrix, and some very fine red and black obsidian.

WICHITA GEM AND MINERAL SOCIETY recently heard Dr. Robert Berg, head of the Geology Department of the University of Wichita, speak on "The Geology and Minerals of the Tri-State Area." This area, which includes southeast Kansas, southwest Missouri, and northeast Oklahoma, is famous for its lead and zinc mining. Exhibited at the meeting were fossil and mineral specimens found by WG&MS members in the Tri-state area.

RECOMMENDED READINGS

"Uranium," anonymous, December issue of *Rock Rustler's News*. A man who has found uranium tells of the dangers from both man and nature that threaten the uranium hunter, the small chance of finding the valuable ore, and the high cost of mining it when it is discovered.

"Nebraska Paleontology," by Bertha Minardi, November issue of the *Rear Trunk*. Nebraska's fossil deposits yield evidence that twenty-pound horses, giant wooly mammoths and great sabre-toothed tigers were once part of Nebraska's fauna.

"My Grandfather's Lizard," by Dr. Arthur Hopkins, December issue of the *Keystone News Letter*. Dr. Hopkins relates how the bones of a great extinct saurian were found in the marl of his great-great grandfather's farm near Haddonfield, New Jersey in 1838.

(A mimeographed list of publications will be furnished on request by the Club Editor.)

BACK NUMBERS of Earth Science are still available. Some are in short supply and will soon be gone. If you like Earth Science, you will find much to enjoy in previous issues. All numbers 35 cents each, or 3 for $1. Write Earth Science, Box 1357, Chicago 90, Illinois.

1946

November—Craters of the Moon National Monument, by H. N. Andrews, Jr. An Alaskan Gold Deposit, by Victor Shaw.

1947

January—Natural Steam Plant, by W. D. Keller. Alaska Gold Trails of '98, by Victor Shaw.
February—Michigan Minerals, by Henry P. Zuidema. A Missouri Ebb and Flow Spring, by W. D. Keller.
April—Famous Lost Mines, The Lost Dutchman, by Victor Shaw. Origin of Dolomite, by Kenneth J. Rogers.
May—Famous Lost Mines, The Lost Pegleg Smith, by Victor Shaw. What Camera for the Earth Scientist, by W. D. Keller.
July—Prospecting With a Geiger Counter. Famous Lost Mines, The Lost Dutch Oven, by Victor Shaw. Notes on Crinoid Research, by Harrell L. Strimple.
August—Nebraska's Marsupial Tiger, by H. P. Zuidema. Lake Superior Agate, Part I, by T. C. Vanasse. Famous Lost Mines, The Lost Arch, by Victor Shaw.
November—Zeolites for Lapidaries, by Richard M. Pearl. Famous Lost Mines, The Lost Tub, by Victor Shaw.
December—What Happened to the Dinosaurs, by Russell C. Hussey. Famous Lost Mines, The Lost Papuan, by Victor Shaw.

1948

January-February—Pollen Grains Write History, by Stanley Cain. Famous Lost Mines, The Lost Gunsight, by Victor Shaw.
April—Sir William Logan, Father of Canadian Geology, Part I, by E. J. Alcock. Geology and the Microscope, Part II, by Jerome Eisenberg.
May—Fire Clay, by W. D. Keller. The Barite Group Minerals, by Richard M. Pearl. Sir William Logan, Part II.
June—Colorado Mineral Localities, by Richard M. Pearl. The American Federation and Earth Science Expansion, by Ben Hur Wilson.
July—Digging for Dinosaurs, by Horace G. Richards. How to Clean Mineral Specimens, by Mary Piper.
September—Forms and Origin of Caves, Part I, by Charles E. Hendrix, Fulgerites, by E. Carl Sink. History of Fossil Collecting, Part II.
October—Forms and Origin of Caves, Part II. Water Witches by W. W. Schidler. History of Fossil Collecting, Part III.
November—Coal Age Flora of Northern Illinois, by Frank L. Fleener. How the Amateur Geologist Can Aid Science, by Gilbert O. Raasch.
December—The Gros Ventre Landslide, Part I, by H. P. Zuidema.

1949

February—The Moonscar Upon the Earth, Part I, by Harald Kuehn. Staurolite in Georgia, by A. S. Furcron. Bryce Canyon National Park, by Roger L. Spitznas.
March—The Moonscar Upon the Earth, Part II. The Geological Survey, by William E. Wrather.
April—Surface Geology at the Border of an Ice Sheet, by C. W. Wolfe.
May—Coal Geology, by Gilbert H. Cady.
June—The Search for Uranium, Part I, by W. S. Savage. Petroliferous Geodes, by Roger L. Spitznas.
July—Scenic Kansas, by Kenneth K. Landes. The Search for Uranium, Part II.
August—Soil Erosion in Southern Russia, by Wilhelm F. Schmidt. The Search for Uranium, Part III.
September—The Blister Hypothesis and Geological Problems, by C. W. Wolfe. The Green River Oil Shales, by Jerome Eisenberg.
October—Mt. Mazama and Crater Lake, by Jerome Eisenberg.
November—Geophysical Exploration With the Airborne Magnetometer, by Homer Jensen.
December—South Central New Mexico's Sinkholes and Craters, by Alfred M. Perkins.

1950

January—The Arkansas Diamond Area, by J. R. Thoenen, etc.
February—Archeology and Geology of Northwestern Alaska, by Ralph S. Solecki.
April—Geology by the Mackenzie Delta, Arctic Canada, by Horace G. Richards, Geophysical Exploration, Part II.
May—Teaching Earth Sciences in Secondary Schools, Part I, by Jerome Eisenberg.
June—Geologic History of the District of Columbia, by Martha S. Carr. Teaching Earth Sciences in Secondary Schools, Part II.
July—Atomic Raw Materials, Part I, by Robert J. Wright. A Geologist Visits Europe, by Horace G. Richards. Teaching Earth Sciences in Secondary Schools, Part III.
August—Atomic Raw Materials, Part II. Sedimentation Studies at Lake Mead, by Herbert B. Nichols.
September—Fossil Localities of Northwestern New Mexico, by H. P. Zuidema. Geochemical Prospecting for Ores, Part I, by Jerome Eisenberg.
October—Potential Mineral Resources of Yukon Territory, by H. S. Bostock.
November—Geological Research in Finland, by A. Laitakari.
December—Potholes in the Navajo Sandstone, Zion National Park, by Roger L. Spitznas. The Origin of Sea Water, by Herbert B. Nichols.

1951

January—Evidence for a Primitive Homogeneous Earth, by Harold C. Urey. New Trilobites Described, by Herbert B. Nichols.

1952

July—Canon City Panorama, by Richard Pearl. Geological Features of Twin Cities, by George A. Thiel. Chubb Crater, by V. Ben Meen.
September—Studies in Coal, by Frank L. Fleener. Minerals of Eastern Federation, by H. L. Woodruff. Asteriated Gems, by Dr. W. B. S. Thomas.
November—Rattlesnake Butte, by June Zeitner. Meteorites of Xiquipilco, by H. H. Nininger. Studies in Coal, Part 2. Fleener.

1953

January—Unakite Granite of Virginia, by Dr. Waldo Jones. Famous Lost Mines, the Lost Chinese Rocker, by Victor Shaw. Studies in Coal, Part 3.
March—Atomic Research at Argonne Laboratory, by Robert B. Laraway. Lapidary Topics, Sawing, by William J. Bingham. Silver Islet, by Dr. Frank Fleener.
May—Crown Jewels of England, Dr. J. W. Willems. Into the Dinosaur Country, Wayland W. Magee.
July—Indian Mining and Use of Lead, Dr. H. W. Kuhn; Pothole Erosion, R. L. Spitznas; Symmetries and Asymmetries in Meteor Crater, H. H. Nininger.
September—In Memoriam—Bethel J. Babbitt; Is Boise Sitting on a Volcano, Rhodenbaugh; Worms, Earth Science and Evolution, Burke Smith.
November—Clay Science, Edmond P. Hyatt; Paste-Imitations, J. W. Willems; Rare Fossil Lizards in Kansas, John Watson.

1954

January—Importance of Rhythmic Features, Sauvan; Juvenile Waters, Gaston Burridge; History of Coal, IV, Frank Fleener.
March—Mount Monadnock, Wetherbee; The Great Reptiles, Garrison; Trilobites, Montague.
May—Giant Beavers, Kuhm; Triple Divide Peak, Cooke; Southwest Indian Jewelry, MacFall; Indian Village Locations, Malott.
July—Michigan Minerals, Mihelcic; Cave of Altamire, Dykgraaf-Exner; Bühl Mt. Iron in Basalt, Morely.
September—Kensington Runestone, Denstedt; Idar-Oberstein Restoration, Willems; Death Valley Sagenite, Barnett.
November—Saugus Ironworks, Wilson; Silurian Trilobites, Montague; Bad Lands Chalcedony, Zeitner.

SEQUEL TO SILVER CRAFTSMAN ARTICLE

As a sequel to our article "Memories of an Old Time Silver Craftsman," by L. C. Aldrich in the March 1953 issue of EARTH SCIENCE DIGEST, we are quoting interesting highlights from a letter received from Mrs. Julian Wetherbee, of Keene, New Hampshire, which presents some valuable information of an historical nature, which we should like to preserve in this manner.

"I have been inquiring about the Craft Shop in Keene, that is mentioned in the article by Mr. Aldrich," writes Mrs. Wetherbee, "and have learned that John Verburg, the Dutchman, is living in Troy, New Hampshire. We called on him recently and found that he was born in Chicago, in 1885. His parents came from Holland, and the year after he graduated from High School, his family moved to New Hampshire.

"We first met Mr. Verburg some years ago when he came to see us about some stones. At that time he showed us quite a number of pieces of very nice jewelry he had made. For some years now he has been making this very fine jewelry, selling it through the New Hampshire Arts and Crafts.

"The day we visited Mr. Verburg he showed us a ring he was repairing, that he had made about forty years ago when he had his shop on Church Street in Keene. He told us his shop was in existence for about ten years. He also taught at the Normal School, which is now called the Keene Teachers College.

"Some of the gem materials he used came from Roylston, Massachusetts also from Alstead, Gilsum and Surry, New Hampshire.

"The old gentleman who faceted some of the stones for Mr. Verburg was Mel Allen. His brother Ernest Allen, now past 82 years old, still has some of the faceted stones. He is a mineral collector and belongs to the Keene Mineral Club, but never had gone in for cutting stones.

"Mr. Verburg said Mel used a quadrant and rod and the dop stick slid on this rod.

It was quite a task to cut stones in this way. I've seen quite a few he cut and one, a real large aquamarine, cut by Mel, I would say was a wonderful job of cutting. In fact I own one of his aquamarines, and the large one is owned by a Mr. Hayward living in Keene.

"Mr. Verburg also showed us a tray of fine cabs he had made. He said he recalled L. C. Aldrich very well. The third man who worked in the Craft Shop was Reginald F. Howe, who now lives at 515 Elm Street in Keene.

"In regard to the Newburyport Silver Company, also mentioned by Mr. Aldrich, that was in Keene on Church Street across from the Craft Shop. Local people put up money for this company and the business only lasted about 2 years, the people losing all their money.

"I am happy to be able to furnish you with this information, and would be glad to make the acquaintance of visiting "rock hounds" passing this way.

Queen Accepts Giant Opal for Royal Jewels

A 200 carat white opal set in a diamond necklet adds luster today to Britain's collection of royal jewels and also provides Queen Elizabeth a memento of her recent visit to Australia, home of the opal.

Like many a world traveler, the queen returned from her recent globe circling tour with souvenir filled trunks. One of the most impressive gifts, the white opal, was presented by the state of South Australia.

Opals and Australia have become almost synonymous, the National Geographic Society comments. For the island continent is now the world's chief source of these fragile, beautiful, and legend haunted gems.

The old superstition that they are unlucky holds no terrors either for the queen or for opal miners. The only bad luck, says prospectors, is not to find the opal.

Two other Australian states, Queensland and New South Wales, share with South Australia the profits and hardships of opal

hunting. Most of the gem deposits are worked in regions as desolate as any on earth. The remotest mining camp is the strange little community of Coober Pedy on the desert's edge in central South Australia.

So pitilessly is Coober Pedy exposed to the white hot glare of the sun and so scarce is timber for building materials that its inhabitants all live underground. Appropriately its name comes from an aboriginal phrase that means "white man in a hole."

Life is hard and meager in the Coober Pedy caves. Luxuries are non-existent. Water is strictly rationed. And temperatures often soar above 120 degrees.

Yet, opal fever gets into the blood and holds men to the diggings. Coober Pedy, like the Andamooka field to the southeast (which produced Elizabeth's gem), has yielded fortunes since it was discovered in 1915.—*Chicago Tribune* Press Service.

THE AMERICAN GEM AND MINERAL SUPPLIERS ASSOCIATION, whose principal objective is to encourage fair and ethical dealing with the public and with each other, publishes a monthly Bulletin (1111 17th Street N.W., Washington, D. C.) for the members of the Association, which among other things impresses one with the real magnitude of the Mineral Supplies Industry. In fact this is fast becoming big business when one takes all of the various angles into consideration.

There are the retailers and the wholesalers, the lapidaries and the manufacturers, the mineral, gem, and equipment sellers, to say nothing of the book publishers and the various magazines entering into the field. Furthermore the future of the business indeed seems to be very bright, for there is not one customer now to where there will be literally dozens when the "rock-bug" really bites the great masses of the public, as it is bound to do sooner or later, with all of the big-time magazine publicity it is now getting. Our one weak place at present seems to be our lack of Earth Science taught in our Public Schools.

It looks as though most school administrators think that a rock is only something to throw at birds, and fail utterly to realize that many of our social ills are directly traceable to our individual lack of understanding of our physical environment, and the general purpose of life. Speed the day when every school child will be taught at least the rudiments of the Earth Sciences.

A New Simplified Method of Sanding Gem Stones

A new simplified method of sanding gem stones has just been developed which should be of interest to arts and crafts hobbyists and to many students in the nation's schools who are interested in jewelry crafts and gem stone work.

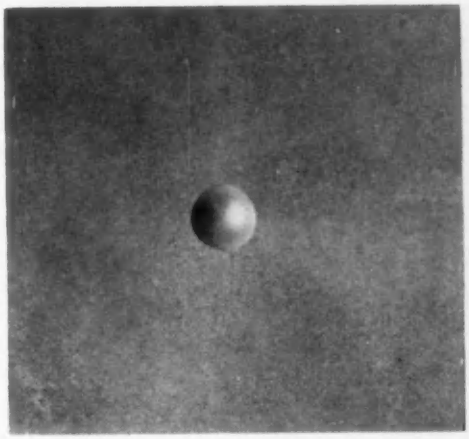
Brightboy Wheel

A set of long-lasting rubber-bonded abrasive wheels, known as Brightboy lapidary wheels, which are said to be particularly effective in simplifying sanding operations on such stones as opal, agate, moss agate, tigereye and the various grades of jade, has just been introduced

by the Weldon Roberts Rubber Company, Newark 7, N. J. The occurence of "orange peel" effect and pitting on jade is eliminated.

The manufacturers of Brightboy lapidary wheels state that the soft rubber binder and the abrasive, working together, achieve almost unbelievable results. The wheels always remain uniform in texture, constantly presenting an abrasive surface just right for sanding gem stones. The padding and fuss of sanding cloth are completely eliminated when Brightboy lapidary wheels are used.

Only two Brightboy wheels are all that are required for sanding any gem. The wheels may be used wet or dry. The long-wearing wheels come two to the set, one wheel fine, the other coarse. Sets No. 1-L and No. 3-L are recommended for use on vertical arbor machines; sets No. 2-L and 4-L for horizontal arbor machines.



AMATEUR LAPIDARY we know (and a good one) who is also an amateur photographer (and a good one) was commissioned by a publisher for gem color photographs to make a book page. Lacking the right pearl, our chap went to a jeweler friend who, also lacking, took him up the hall to a Japanese importer. Just the right one ($1200) was loaned on the jeweler's scribbled receipt. What a fraternity we belong to!

BLACK HILLS MINERAL ATLAS

All available information on known mines and mineral deposits in South Dakota's Black Hills will be summarized in a comprehensive "mineral atlas" being prepared by the Bureau of Mines. The first volume of the two-part report, covering Lawrence and Mead Counties and parts of Butte and Pennington Counties, was released by Acting Secretary of the Interior Ralph A. Tudor.

When completed, the report will make possi-

CLASSIFIED ADVERTISING

Rate: Six Cents per word, per issue. Minimum, $1.00, payable in advance. No proofs or copies for checking are furnished. Introductory words will appear in CAPITALS. When additional capitalization is required, each such word counts as two words. No charge for name and address.

CALIFORNIA RHODONITE — Choice pink with black inclusions for picture effects, 75¢ lb. Agatized whale bone, 50¢ lb. Postage Extra. New and used lapidary equipment list free. Practical instructions by mail "How to Cut Gems" $1.00. Satisfaction guaranteed. LEE DEWING, Rockcraft, 1923 Empire, Burbank 7, Calif.

MINERAL COLLECTION FOR SALE. 200 Specimens, some fossils and fluorescents, $50.00. GUILD, 630 Greenleaf Ave., Wilmette, Ill.

RARE TEMPSYA, eyed or curly labs, also mosses and buds. Write for price list. Other material. ART'S AGATE SHOP, 2820 "D" St., Baker, Ore.

GET YOUR GEMS FROM BRAZIL, directly from the lapidary in the Country they come from. Complete price list with one faceted gem only $1.00. All Brazilian gemstones listed cut and uncut. All cut gems offered are flawless. Twelve different raw gemstone specimens for collectors $2.00. Perfectly cut smoky citrine 25¢ per carat. White precious topaz 1.80 p/ct. PURE WHITE FIRST QUALITY FULL BRILLIANT CUT DIAMOND (flawless under 6-power lens) 1/20 ct. (five points) $8.00. Alexandrites, aquamarines, catseyes, etc. Airmail check or draft today asking for your copy and sample gem. JEAN BACH, Caixa Postal 146, Niteroi, Estado Rio, Brazil. (Sorry, NO postal money orders accepted).

QUARTZ CRYSTALS. Unusual specimens from several localities. Odd twinning and other features. Reasonable prices. On approval. CLAUDE D. SMITH, Box 291, Geneva, New York.

BOOKS FOR COLLECTORS AND LAPIDARIES—Gem Trail Journal for your field trips $2.00; Indian Silversmithing, an excellent work for lapidaries, $5.50; Dake's Gem Cutting, $2.00; English's Getting Acquainted With Minerals, $5.00; Dana-Hurlbut's Minerals and How to Study Them, $4.75. Ask for other titles. PAUL VANDEREIKE, Route 2, Box 1168, Vista, Calif.

U. S. GEOLOGICAL SURVEY BULLETINS, other publications, back numbers bought and sold. Also files of periodicals. J. S. CANNER & Co., Inc., Boston 19, Mass.

SPECIAL OFFER. Fossil sea urchin. Cretaceous age, 35¢ and 50¢. Clear quartz crystal clusters, 35¢. Postage extra. List of other specimens free with first order or send 3c stamp. ANTHONY THURSTON, Morningdale, Mass.

BAROQUE GEMS, medium sizes, highly polished, assorted mix, 15¢ each. Fifty Missouri rock and mineral specimens, 1" to 2½", 10¢ to 40¢ each; set of 50, $10.00. Lapidary Supplies, Books, Gem Materials, Mineral Specimens, Mineralights. Malachite (Belgian Congo), thick slabs, 40¢ sq. inch. Price list free. Send postage with order. BRENTWOOD LAPIDARY & GEM SHOP, 8913 White Avenue, St. Louis 17, Mo.

DANGLE JEWELRY at wholesale prices from Palm Springs. In mirror-like polished baroque gems of green aventurine, rose quartz, sparkling rock crystal, or reds, yellows, grays, black & white, Montana moss, translucent or pastel colors in agate or jasper. Made up to your order, one kind or variety. Postpaid. Necklace, 3 large 1" baroques in Sterling silver, $3.95. Bolo necklace, 2 baroques, 1½" up, Sterling silver, $3.59. Earrings, 2 baroques, ¾" up, Sterling silver, $2.59. Tie clasp, pendant or bow pin with 1" or larger baroque, $1.95. The above in amethyst or citrine, necklace or bolo, $4.95; earrings, $2.95; others, $2.58 each. Add 10% Excise tax. KING LAPIDARY, 667 Indian Trail, Palm Springs, Calif.

SOUTH TEXAS AGATE from the Rio Grande, variegated colors, carefully selected, moss, lace, plume, banded, picture, some unusual designs. Eight lbs., $5.00, postpaid; 100 lbs., $35.00, F.O.B. Raymondville. THE AGATE SHOP, 704 W. Kimball Ave., Raymondville, Tex.

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ble a general determination of the potentialities of the Black Hills as a mineral-producing region. It will also provide basic information necessary for detailed study of a given property or commodity.

The Black Hills cover an area approximately 100 miles long and up to 50 miles wide in the western part of South Dakota and the northeastern part of Wyoming. Mining in the area began in 1874, when a military expedition under General Custer found a placer deposit of gold. This led to discovery of lode gold, the first claims for which were filed in 1875 on what is now part of the fabulous Homestake property.

Tin production began in 1876 from pegmatite dikes which occur principally in the southern Black Hills and, although short-lived, it led to mining of other pegmatite minerals, including mica, beryl, spodumene, columbite-tantalite, and feldspar. Limestone, sandstone, gypsum, bentonite, and cement also contribute substantially to the mineral production of the area.

The report discusses the history, production, and geology of the Black Hills, indexes mines and mineral properties alphabetically, numerically, and by commodities, and gives brief but detailed descriptions of each property. A bibliography is included.

A copy of I. C. 7688, "Black Hills Mineral Atlas, South Dakota, Part I," can be obtained

from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa. It should be identified by number and title.

Pumpkin Buttes Uranium Field

A map showing the geology and the localities where radioactivity has been detected in the east-central part of the Pumpkin Buttes area, Campbell County, Wyoming, has been released by the Geological Survey.

The map, compiled on a scale of 1:24,000 on a topographic base, shows about 200 localities where anomalous radioactivity has been detected on the ground. Some of these were first detected by airborne surveys conducted by the Geological Survey and the Atomic Energy Commission. Uranium minerals have been observed at most of the localities but the source of the radioactivity at some places is not known.

The western part of the map shows the distribution of sandstone beds in the Wasatch formation that are favorable for the occurrence of uranium. The eastern part of the map shows the boundaries of the area judged to be most favorable for the occurrence of uranium based on criteria such as the abundance of red sandstone and the presence of dark-brown to black concretions of iron and manganese oxides.

"Geologic map of the east-central part of the Pumpkin Buttes area, Campbell County, Wyoming," by M. L. Troyer, E. J. McKay, S. R. Wallace, and P. E. Soister, was prepared in 1952 as a part of the program for the investigation of uranium deposits conducted by the Geological Survey for the Atomic Energy Commission. Copies of this map have been placed on open file and are available for inspection at the following Geological Survey offices: Geological Survey Library, Room 1033 General Services Administration Building, Washington 25, D. C.; Room 724 Appraisers Building, San Francisco, Calif.; Room 468 New Customhouse, Denver, Colo.; Geology Hall, University of Wyoming, Laramie, Wyo.; Room 807 Post Office and Courthouse Building, Los Angeles, Calif.; 1214 Big Horn Avenue, Worland, Wyo.; and 315 Federal Building, Billings, Mont. Copies may also be consulted at the Bureau of Mines, Rapid City, S. Dak., and at the following offices of the Atomic Energy Commission; Denver Explorations Branch, Denver Federal Center, Denver, Colo.; Hot Springs Suboffice, Hot Springs, S. Dak.; and Douglas Suboffice, Douglas, Wyo.

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